



Organization: Intelligent Optical Systems

Title: Microsystem Simulation Of Optical-Based Biochip

Start Date: Jan 2001 **End Date:** 08/31/01

MTO

BioFlips

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DAAH01-01-C-R019

Project Goals

. There are currently no computational modeling tools that can simulate fundamental experimental measurements and predict microsystem performance over a range of operating conditions. Intelligent Optical Systems, Inc. (IOS) proposes to develop a highly innovative microsystem computation model (MCM), based on an optical biochip platform, that will provide a quantitative scaling law of microsystem behavior. The proposed MCM-biochip will provide a method for researchers to develop a quantitative understanding of the interaction between the different technologies, and also provide a tool for the routine analysis and design of integrated microsystems.

Technical Approach

- Intelligent Optical Systems, Inc. (IOS) proposes to develop a highly innovative microsystem computation model (MCM) that can be used for integrated optic biochip (IBC) design, simulation, and quantification. The proposed MCM-biochip design software will provide researchers with a tool for developing a quantitative understanding of the interaction between the different technologies, and also a tool for optimal IBC design and analysis. During Phase I, we will focus on designing and developing the MCM-biochip model/simulation system, fabricating experimental biochips, integrating the optoelectronics, immobilizing patterned bio-probes, characterizing and testing the system, and determining the feasibility of the proposed concepts

Recent Accomplishments

- Designed and configured integrated optic chip

Six-Month Milestones

- The resulting MCM system will offer a quantitative characterization/simulation of the
- 1. Integrate optic chip design and configuration,
- 2. Bio-molecular recognition process and kinetics,
- 3. Optical field function and distribution,
- 4. System response time, and
- 5. Correlation between transduction of the molecular recognition signal into an optical signal

Team Member Organizations

Dr. Z. Z. Ho, Dr. Claudio Egalon, Dr. Srivatsa Venkatasubbarao, and Dr. Robert Lieberman
